Theorem: All odd numbers take the form 4n+1 or 4n+3

Proof: Take an arbitrary odd number c = 2k+1. Since k is defined to be an integer it will either be even or odd. If k even then k = 2n for some n so 2k+1 = 4n+1 by substitution. If k odd then k = 2n+1 for some n so 2k+1 = 4n+3 by substitution.

In other words an arbitrarily chosen odd number c = 4n+1 or 4n+3. Since c was chosen arbitrarily this holds for all odd numbers and the theorem is proved.